

producing basidiospores germinating by repetition, and forming basidiocarps that usually are waxy or gelatinous in texture. The Homobasidiomycetidae, not treated in the monograph, includes all other Basidiomycetes, i.e., Aphylllophorales, Agaricales, and Gasteromycetes, which have undivided basidia lacking notably enlarged or swollen sterigmata, have basidiospores not germinating by repetition, and have mostly nonwaxy and nongelatinous basidiocarps.

The Systematic Treatment embraces five families of Heterobasidiomycetidae (Auriculariaceae, Hyaloriaceae, Phleogenaceae, Sirobasidiaceae, and Tremellaceae) classified in the order Eutremellales, and three families of Metabasidiomycetidae (Ceratobasidiaceae, Dacrymycetaceae, and Tulasnellaceae) in the order Metatremellales. Forty genera and one subgenus including 144 species and four varieties are characterized and synonymies given. Keys to the families, genera, and species are provided. Basidial, sporal, and hyphal characteristics of representative species of 20 genera of the eight families are illustrated by line drawings in 24 plates; basidiocarps of representatives of six genera are pictured photographically in five plates; and eight maps depict the geographical distribution of all species described in the text. A list of three excluded and 26 incompletely known species is appended.

Literature citations (136 references) and a general index complete the volume.—RICHARD K. BENJAMIN, Rancho Santa Ana Botanic Garden, Claremont, California 91711.

*Experimental Studies on the Nature of Species V. Biosystematics, Genetics, and Physiological Ecology of the Erythranthe Section of Mimulus.* By W. M. HIESEY, M. A. NOBS, and O. BJORKMAN. vi. + 213 pp. Carnegie Institution of Washington, Washington, D.C. 1971. \$6.75 (paper).

This well written monograph is the latest volume of the now classical series, *Experimental Studies on the Nature of Species*. The basic questions that the current authors pose vary little from those asked in the earlier volumes. However, the development of insights into the actual substance of the questions over the last several decades and the employment of new research techniques (particularly for the analysis of morphological data as well as for the critical measurements in the physiological studies) have resulted in a meaningful and highly informative study.

The study is divided into four main sections: Biosystematic Relationships within the *Erythranthe* section of *Mimulus*, Genetic and Transplant Studies, Comparative Physiological Studies on Ecological Races and Species, and Growth of Excised Tissues of *Mimulus* under Aseptic Conditions. The fifth section is a short history of the levels of approach in the study of the nature of species as well as a discussion of the direction future studies will take.

From the biosystematic data it has been established that sect. *Erythranthe* is divided into two species complexes, *M. cardinalis-lewisii* and *M. verbenaceus-eastwoodiae-nelsonii*. Further, genetic and transplant studies involving the use of morphological and physiological characters have shown that within these complexes the populations comprising each species possess definite genetic similarities. However, the data also indicate that real genetic differences between populations and races of a particular species exist alongside these genetic similarities.

The comparative physiological studies should be particularly mentioned. A set of factors (e.g., light intensity, CO<sub>2</sub> concentration, and temperature) that affect the photosynthetic rate were investigated in great detail and with great precision in *Solanum*, *Atriplex*, and *Solidago* as well as in *Mimulus*. The net result of this work is the emergence of an understanding of alternate modes of physiological differentiation in response to environmental diversity. With the publication of this monograph the future direction of this Carnegie group may be clearly seen.—DENNIS R. PARNELL, Department of Biological Sciences, California State University, Hayward 94542.